

## **Alternative 14**

# **West-Side Sacramento Small Transfer Facility**

## **Alternative 14**

### **West-Side Sacramento Small Transfer Facility**

#### **Emphasis**

This alternative reduces export entrainment impacts and increases supplies by shifting the location and timing of a portion of exports.

#### **Distinguishing Features**

##### Physical and Structural Features

A new diversion at Thermolito Forebay on the Feather Rivers to a west-side Sacramento Valley offstream storage facility (2 MAF) with a connection to the Tehama Colusa Canal. Canals connecting the new storage to other Sacramento Valley agricultural canals an isolated facility (5,000-10,000 cfs) connect to the export pumps. A moderate level of physical environmental improvements in and above the Delta, including habitat restoration, new screens and a salmon bypass facility at Old River. Water reclamation projects. Levee improvement projects.

##### Operational and Management Features

Diversions through the Tehama Colusa Canal are at capacity year round. Diversions from Thermolito Forebay only take place during surplus conditions. Deliveries through the isolated system to the export pumps are generally at capacity. Sacramento Valley agricultural demand is centered on the summer. The new storage site balances this mismatch between the timing of supply and demand, rising in the winter and falling in the summer. Environmental flows are altered through reservoir operations and water purchase (100 TAF on the San Joaquin River). Real time management.

##### Institutional and Policy Features

A variety of programmatic elements, including groundwater storage, hatchery operations, reclamation, management of water quality, land use programs, and dredging policies. No major institutional elements identified. However, water facilities and real time management components have major institutional implications.

#### **Benefits**

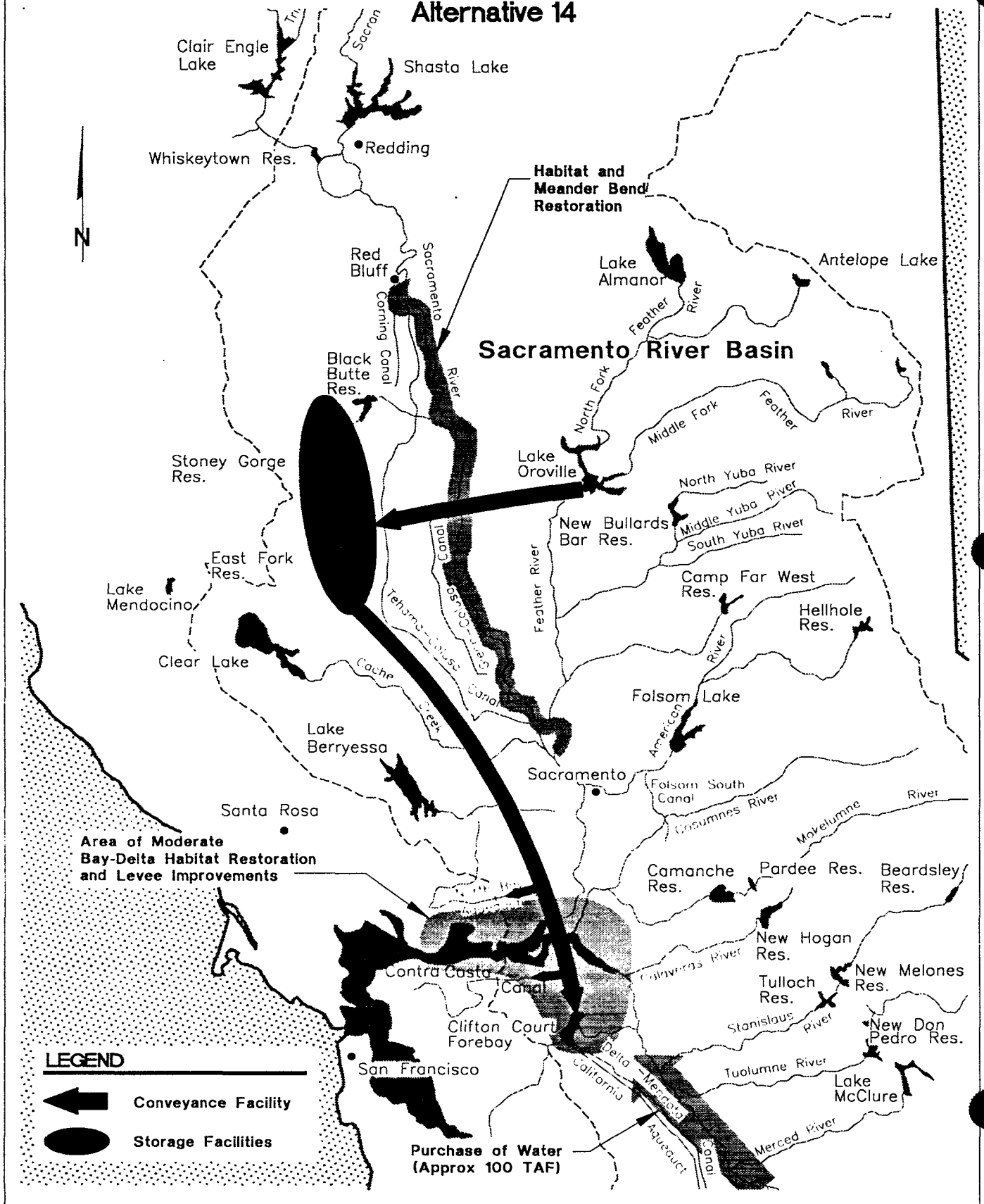
- Improves environmental instream flows
- Reduces fish mortality caused by operations
- Reduces pollutant mass loading and improves timing of discharges.
- Improves export water quality
- Improves flexibility of diversion timing
- Increases dry year reliability of system
- Increases opportunities for market transfers, particularly north-south transfers
- Improves Sacramento Valley and Delta water supply reliability
- Reduces vulnerability of Delta water supplies
- Reduces Delta island vulnerability

#### **Constraints and Concerns**

- Mortality in South Delta export facilities not eliminated
- Reduced instream flows below Thermolito, Tehama Colusa diversion points
- Possible reductions in south Delta water quality
- Possible new entrainment of salmon smolts into Tehama Colusa diversion
- No measures to resolve unsustainability of current Delta land uses

# Westside Sacramento Small Transfer Facility

## Alternative 14



## **Alternative 14**

### **West-Side Sacramento Small Transfer Facility**

This alternative focuses on increasing populations of anadromous and Bay-Delta native fish through a moderate level of habitat improvements, by reducing the impact of the south-Delta pumps on fisheries by providing a percentage of export water from new upstream diversions, and by making water purchases and exchanges to help move fish past the pumps in the south-Delta. New storage in the upper Sacramento valley will be developed to increase the water supply reliability and water quality. Levee improvements will be made in ways that reduce system vulnerability while improving ecosystem quality. Source control of pollutants and reclamation will increase water quality for all beneficial uses.

Habitat improvements will be made throughout the watershed to improve ecosystem quality and aid the recovery of species of special concern. In-Delta levee water side and land side modifications to provide shallow water habitat and riparian habitat will be made at many sites. Dredge material will be used to recreate new shallow water habitat and Delta island habitat. Habitat improvements will also be made upstream and downstream of the Delta, including riparian habitat on the Sacramento River, channel improvements on the San Joaquin River, and conversion of diked wetlands to tidal wetlands between Collinsville and Carquinez Strait. Water supply reliability and Delta species will both benefit from new storage and modified water operations. About 100,000 acre feet will be purchased from sources on the San Joaquin River system to benefit fish. Uses might include pulses to aid fish movement, dilution of poor quality San Joaquin River flows, or exchange with export customers at critical times so Delta exports could be curtailed. Operation of Clifton Court Forebay will be modified to reduce intake of fish.

A small percentage of flood flows in the Sacramento and Feather Rivers will be captured in new upstream storage and released at critical times for west Sacramento valley agriculture and for Delta supply. This will allow changes in present diversion patterns to increase at times of lesser environmental sensitivity, such as winters of above normal and wet years. Diversions will be via pumps at the Red Bluff diversion dam and conveyed via the Tehama-Colusa Canal to a new off-stream reservoir. Diversions by gravity from the Thermalito afterbay will be conveyed by new facility to the off- stream reservoir.

A small, west-side transfer facility connected to the new reservoir will convey releases from the new reservoir to the pumps in the south-Delta with possible interties with the North Bay Aqueduct, Contra Costa Canal and the South Bay Aqueduct. Delta water quality will be

improved through point and nonpoint source control and agricultural, industrial, and municipal wastewater reclamation and reuse, and timing and dilution of releases of poor quality agricultural drainage. The vulnerability of Delta land use, Delta water supply, agricultural export water supply and Delta ecosystem function to catastrophic failure is reduced by improving levees on critical western islands, and elsewhere within the Delta.

## **Physical and Structural Features**

***Delta Levee Habitat Restoration***— Restore approximately 100 levee miles of shallow water, riverine and riparian habitat in the Delta to provide forage and cover habitat for resident and anadromous fish, and to provide other benefits associated with riparian habitat. Actions might include setback levees, creation of berms, creation of shallow water habitat, and increased vegetation on levees. Considerations for site selection will include distance from hazards such as pumping plants, protection from waves generated by wind and boat wakes, importance of island integrity to the maintenance of Delta water quality, and need to improve channel capacity and structural stability of levees. Good candidate areas are Twitchell Island along Three Mile Slough and Seven Mile Slough, Georgiana Slough, and the north and south forks of the Mokelumne River.

***Delta Habitat Restoration***— Restore shallow water and tidal wetland habitat in the Delta to provide spawning areas, forage areas, and escape cover for juvenile salmon, Delta smelt, splittail, and other species. Candidate areas include Prospect Island, Liberty Island, Little Holland Tract, Decker Island, Hastings Tract, Yolo Bypass, and the southeast Delta. Also restore shallow water shoreline habitat along margins of the lower Sacramento and San Joaquin channels, and tributary sloughs including Georgiana Slough, Barker Slough, Lindsey Slough, and Parker Island. Riparian, wetland, and terrestrial habitat would also be restored on Delta islands and upland areas adjacent to river channels.

***San Joaquin River Habitat Restoration***— Restore channel features to improve fish survival. Actions may include restoration of deeper, narrower channel areas to keep water cooler, and isolation of quarry areas to protect young fish from predation and straying.

***Bay Habitat Restoration***— Restore about 2,000 acres of tidal wetlands between Collinsville and Carquinez Strait. Actions may include conversion of diked wetlands to tidal wetlands or use of dredge spoils to create wetland areas. The resulting habitat types

will provide wet year spawning habitat for Delta smelt, rearing areas for salmon, as well as habitat for diverse wildlife including canvasback and redhead ducks.

***Channel Islands***— Restore and protect channel islands. Evaluate contribution of upstream meander belts to sediment deposition at channel islands. Establish zones for different types of boating use so some areas are protected from large boat wakes.

***Install Bypass at Mouth of Old River***— Construct a bypass at the mouth of Old River that will encourage out migrants to stay in San Joaquin River while allowing a managed flow down Old River.

***Fish Screens***— Install fish screens on diversions over 250 cfs that are on fish migration routes in the Delta, rivers, and tributaries.

***New Diversions***— Construct a new diversion at Thermalito afterbay with a capacity to capture significant wet weather flows that would otherwise must be released. (2,000 to 7,000 cfs).

***Develop Additional Off-Stream Storage***— Develop approximately 2 million ac-ft of new storage capacity at off-stream reservoir site(s) that can be fed by the Tehama Colusa Canal, such as the Colusa-Sites reservoir. Operate the reservoir to supply westside Sacramento Valley agricultural irrigation water, and exports from the Delta for agriculture, M&I, and the Sacramento River and tributaries environmental uses.

***Develop Conveyance Facilities***— Develop conveyance facilities to connect the diversions to the west-side storage facility. From the storage facility connect to the Tehama-Colusa Canal, Glenn-Colusa Irrigation District, possibly the North Bay Aqueduct, and a cross-Delta Transfer facility. Provide turnouts to streamflow augmentation points and to groundwater conjunctive use areas on the west and east sides of the valley.

***Construct an Isolated West-Side Cross-Delta Facility***— Construct an isolated conveyance system that connects the west-side storage project to the California Aqueduct and/or the Delta Mendota Canal. The capacity of the facility would approximately equal the present capacity of the Delta Mendota Canal (Around 5,000 to 10,000 cfs).

***Flood Protection Level***— Action provides a moderate level of protection to Delta system levees. First, all levees not yet providing a level of protection equivalent to the hazard

mitigation plan (HMP) will receive the necessary upgrades to their levees to meet HMP standards. A level of flood protection equivalent to the US Army Corps of Engineers' Public Law (PL)- 99 standard would be provided to: (1) critical western Delta islands (such as Sherman and Jersey islands), with important regional infrastructure (e.g. the Mokelumne Aqueduct, transmission lines, Highway 160, etc.); (2) other islands having infrastructure of local importance (such as New Hope Tract, Bouldin Island, Sherman Island, Palm Tract, Lower and Upper Jones Tracts, and Lower Roberts Island); and (3) islands having valuable habitat, but not necessarily infrastructure, (including, but not necessarily limited to Canal Ranch, Brack Tract, Staten Island, Venice Island, Rindge Tract, Webb Tract, Big Mandeville Island, Twitchell Island, and Bradford Island).

***Channel Improvements and Levee Maintenance***— A moderate level of channel improvements (e.g. widening for improved conveyance), levee maintenance and stabilization (e.g. stabilizing berms), the modification of agricultural practices to reduce subsidence potential, setback levees, providing funding for maintenance and stabilization, and maintaining and/or reconstructing levees are indicative of the range of actions that would be implemented with the intent of reducing the risk of the Delta levee system with respect to its value in providing water supply, water quality, ecosystem quality, and land use/infrastructure benefits.

## **Operational and Management Features**

***Real Time Monitoring***— Establish an adequate real-time monitoring to determine location of species of special concern so that project operations can be effectively managed to reduce losses of fish and minimize effects on habitat.

***Acoustic Barrier at Mouth of Georgiana Slough***— Operate an acoustic barrier at the mouth of Georgiana Slough. Work to improve the effectiveness of behavioral barriers. Evaluate use of acoustic barriers at the Delta Cross Channel and 3-Mile Slough.

***Storage of Agricultural Tile Drain Water***— Develop a program with irrigation districts to store tile drain water to be released at times when pulse flows can provide dilution.

***Modify Clifton Court Forebay Operation***— Modify operations of Clifton Court Forebay so that it does not entrain as many fish into the forebay during typical operation. Install regulating gates into Italian Slough so that water can be drawn in over time at a lower velocity. This will reduce the number of fish lost to predation in the forebay.

***Project Operations***— Change reservoir operations to seasonally modify the timing of Delta inflows to increase flows during environmentally sensitive periods such as late spring and early fall.

***Mark Hatchery Fish***— Mark salmon produced in hatcheries to facilitate selective catch by commercial and recreation fisheries.

***Pen Rearing of Striped Bass***— Rear striped bass in pens to maintain recreational fishery and avoid operational constraints on water projects due to spawning bass.

***Mine Drainage Remediation***— Remediate discharges from abandoned mines in tributaries of the upper Sacramento River downstream of Shasta Dam to the maximum extent reasonably possible.

***Management of Water Quality***— Implement actions such as source control regulations for agricultural drainage, retiring lands with drainage problems, and other cost-effective management of urban, agricultural, and industrial discharges and runoff to improve Delta water quality.

## **Institutional and Policy Features**

***Water Quality Standards***— Maintain current standards for Delta water quality and position of X2.

***Other Programs***— Implement recommended habitat restoration actions from other programs, including CVPIA and the Anadromous Fish Restoration Plan. Examples of specific actions include small dam removal on Clear Creek, dam removal on Battle Creek, establishment of a population of winter run chinook salmon on Battle Creek.

***Obtain Environmental Water***— Obtain about 100,000 acre feet from San Joaquin water users to reduce conflicts between fisheries and diversions. Water could be used to provide pulse flows to move Delta smelt downstream, away from diversion points. Another use might be dilution of poor quality San Joaquin River flows, providing benefits for fisheries, water supply, and water quality. New south-of-Delta storage would allow this water to be used as exchange water so that Delta diversions could be reduced at critical times to protect fisheries without affecting export supplies.

***Sacramento River Habitat Restoration Feasibility Study***— Restore riparian, shaded riverine, and shallow water habitat along the Sacramento River from Sacramento to Collinsville. First step will be to provide matching funds for Corps of Engineers feasibility study. Subsequent restoration would be funded 75% by COE.

***Preserve Agricultural Land Uses***— Establish programs to preserve agricultural land uses that help to protect the ecosystem. Examples include limiting levee restoration to levels that are inadequate to permit residential construction on Delta islands, and incentive programs to preserve habitats such as pasture, which is important for sandhill cranes.

***CALFED Regulatory Team***— Determine how to implement a regulatory team to facilitate getting permits for environmental restoration projects. Each member agency would have a key person on team.

***Dredge Materials***— Establish a policy that all future clean dredge material out of the Delta above Chipps Island should go into Delta restoration projects.

***Safe Harbor for Maintenance***— Encourage farmers and levee maintenance districts to leave habitat areas undisturbed when feasible by providing protection from ESA provisions.

***Encourage Groundwater Banking and Conjunctive Use***— In order to maximize the opportunity for groundwater reclamation and recharge, and conjunctive use with the west-side surface storage, encourage and provide the conveyance facilities to aquifers such as the Butte Creek and Stoney Creek Basins.

***Response Program for Introduced Species Control***— Establish and fund a rapid response program among environmental agencies to provide a fast and effective means of managing introduced species in the Bay-Delta. Carry out continuing management programs for nuisance species such as water hyacinth.

***Reclamation***— Reclaim agricultural, municipal, and industrial wastewater for a variety of uses, improving water quality by reducing wastewater discharges.

***Subsidence Reduction***— Efforts to reduce the subsidence on Delta islands with deep peat soils (such as parts of Grand, Twitchell, Sherman, Andrus, and Bouldin islands) will

include the establishment of a landside buffer zone between 50 and 100 yards in width, located adjacent to the levee.

***Emergency Levee Management Plan***— An emergency levee management plan would provide necessary funding and direction to reclaim Delta islands in the event of inundation to continue protection of Delta functions as an integrated resource system. Funding would be provided to ensure that a suitable amount of equipment and materials would be readily available to rapidly respond to flood fights.

## **Preliminary Assessment**

### ***Benefits***

***Ecosystem Quality***— This alternative will moderately enhance ecosystem quality through restoration and enhancement of riverine, riparian, wetland, and adjacent terrestrial habitat. Expansion of floodway habitat, channels, and meander belts in the Bay-Delta will help to restore fish spawning, rearing, and feeding habitats and improve fish survival. Improvements to Clifton Court Forebay will also help in reducing the numbers of fish diverted into the forebay and increasing survival of fish that are drawn into the forebay. Moving a major portion of the south Delta diversions to screened locations upstream of the Delta will also reduce impacts on fisheries.

***Water Supply***— This alternative improves water supply and reliability through development of additional upstream storage and operation of the west-side transfer facility.

***Water Quality***— This alternative improves export water quality by relocating the diversion upstream of the Delta. Delta water quality is improved through reclamation of agricultural, municipal, and industrial wastewater. Other water quality improvements are achieved by point and non-point source controls and mine drainage, remediation to improve water quality.

***System Reliability***— Relocating export facilities outside of the Delta essentially eliminates the risk that operations will be interrupted by a failure of in-Delta facilities. Creation of shallow water habitat simultaneously provides better levees and protection for adjacent land uses. Improvement of the levees around the

critical western islands protects those islands as well as protecting in-Delta and agricultural export water supplies from salinity intrusion due to island failure. Other key, supporting and core actions improve the reliability of in-Delta facilities through levee management, and levee reconstruction.

***Constraints and Concerns***

***Fisheries***— Though improvements to habitat and fish survival will occur, complete restoration of important fish populations may not be possible without eliminating the use of the Delta as a water supply conduit. Mortality in South Delta export facilities would be decreased, but would not be eliminated. Possible new entrainment of salmon smolts into Tehama Colusa diversion.

***Water Quality***— Reduced instream flows below Thermolito, Tehama Colusa diversion points. Possible reductions in south Delta water quality.

***Land Uses***— Limited measures to resolve subsidence of Delta islands site-specific impacts.

***Costs***— Costs may be substantial.

***Vegetation and Wildlife***— Impacts from new storage reservoir.